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B P I S A E

RESEARCH ACTIVITIES

U.S. DEPT. OF AGRICULTURE
JUL 23 1950

PLEASE CIRCULATE TO ALL INTERESTED EMPLOYEES OF THE BUREAU

PLANT INDUSTRY STATION, BELTSVILLE, MD.

JULY 1950

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Future Needs in Fertilizer Research

Taking a look ahead at opportunities for progress in fertilizer technology, Dr. Robert M. Salter, Chief of the Bureau, told the National Fertilizer Association recently that:

"We still have need for non-leaching forms of nitrogen and potash that will yield up their nutrients as crops need them. We also need to develop means of improving plant utilization of applied phosphate.

"Prospects are good for further increasing the total plant nutrient content of mixed fertilizers. While the national average has been boosted to 22.6 percent, the total plant nutrient content has been pushed considerably higher in some areas remote from fertilizer sources. In Minnesota, for example, it has been pushed up to 33 percent. To boost the national average to 30 percent in the next few years should be a minimum goal.

"Further improvement in the physical condition of fertilizers also is essential. Improved physical condition is the key to satisfactory farm storage and to precision placement in the soil. There is need, too, for continued development in the use of trace elements, especially in relation to their use in the preparation of properly balanced fertilizers for those areas where trace element deficiencies are likely."

Speaking at the Association's Centennial Convention, Dr. Salter said that gains in agriculture during the past half century seem small when compared with possibilities of the next 50 years. He pointed out that better use of technology could be made in achieving a balanced agriculture if ways could be found for getting new research developments into use on farms more quickly and if alternate but equally profitable enterprises could be developed for specific areas. As a means to this end, he proposed a nationwide system of pilot research farms, comparable to the pilot plants used in industry, to adapt new technology to the management systems of individual farms.

(Mimeographed copies of Dr. Salter's address, "A Century of Progress in Agronomy," can be obtained from the Information Division, BPISAE, Plant Industry Station, Beltsville, Md.)

Toxicity of Certain Organic Insecticides for Plants

In a recent paper on this subject Arthur C. Foster (F&VC&D) points out that the degree of phytotoxicity of a soil residue or foliage spray may vary with the formulation used--ground dust, impregnated dust, emulsion, wetting agent, or solvent.

Other factors that may affect phytotoxicity are soil types, especially soil colloids and possibly the acidity of the soil. A given quantity, not necessarily an accumulated residue, of some of the organic insecticides that are somewhat volatile such as BHC is sometimes more toxic in the soil than an equal amount of some of the more stable insecticides. The technical grades are made up of several different chemical compounds. The non-insecticidal components may often be the major offenders in phytotoxicity or off-flavors. Some plant species and varieties are entirely uninjured by concentrations of chemicals that are strongly toxic to other species or varieties.

DDT mixed in muck, Chester, Sassafrass, and Evesboro soils at 25 pounds or more an acre and exposed to outdoor weather has apparently remained in the soil and persisted in toxicity to sensitive crops in successive fall and summer plantings for more than four years.

Technical BHC (containing 12 percent gamma BHC) mixed with Chester soil at 100 pounds an acre in September 1946 had partially persisted to December 1949 and has continued toxic to certain crops and to impart a characteristic off-flavor to potatoes. The one test showed that about half of the BHC disappeared in a little over 3 years.

The presence of DDT (100 pounds an acre) in the soil has consistently and repeatedly accelerated pre- and post-emergence "damping off" of the leguminous crops tested. Technical BHC at the same rate has consistently and repeatedly tended to inhibit both types of "damping off." This suggests a fungicidal or fungistatic effect. However, BHC has proved toxic to most plants tested. In the soil pure gamma BHC and Lindane appear to be just as toxic pound-for-pound as the technical material. The delta BHC is highly toxic to all plants tested when used as a wettable spray (2.5 pounds an acre). Lindane at the same rate of spray has not been toxic to the crops tested.

Four Million Acres Mapped Last Year for Soil Surveys

From April 1, 1949, to March 31, 1950, the Soil Survey Division and cooperating State agencies prepared detailed basic soil maps in the field for approximately 4,134,400 acres of rural land and mapped in reconnaissance and semi-detail an additional 457,600 acres.

Field surveys were in progress in 48 counties. Work was completed in 9 counties. On April 1, 1950, 30 soil maps and reports were being processed either in USDA or in the Government Printing Office. Manuscripts of 12 soil survey reports were prepared in final form for publication.

These reports include yield prediction tables for all adapted crops by individual soil types and phases under specified systems of management and soil groups. In the Northern Great Plains, special field studies were made to determine yields under dry-land farming and under irrigation.

Quotes from ASAE Meeting in Washington, June 19-23

"Farmers are concerned about the poor recovery of forage and crop seeds. They want to see something done about it. Improvements in this operation alone would go a long way in providing a large part of the needed increase in seed supplies for expanding forage crop plantings. Here is a challenge for agricultural engineers and equipment designers for the immediate future--a challenge that can't be side stepped." Assistant Secretary Knox T. Hutchinson.

"While the sciences of chemistry and biology are not ordinarily associated with electrification, forces involved in chemical reactions are fundamentally electrical and the electrical properties of living systems are important considerations in many biological experiments. It is essential that electrical implications be considered, whether the electricity be in the form of gamma rays from radioactive materials or in the potentials across the walls of a cell in a living organism." T. E. Hienton (FE)

"Our studies at the Red River Valley Potato Research Center show that average pressure of potatoes in winter storage is almost identical to that of ear corn in cribs. Lateral pressure rather than freezing is probably the cause of bin wall failures in potato storage houses." A. D. Edgar (FB&RH)

"In tests this past winter moisture in shelled corn was reduced 1 to 2 percent at a drying cost of 1 to 2 cents a bushel. Costs of handling the grain in connection with the drying operations often exceeded the costs of drying. This points to the need for planning and installing ventilation equipment before storage buildings are filled with grain." George H. Foster (FB&RH)

"Plans developed under the Housing Act of 1949 for farmhouses of the minimum type provide for essential activities of the farm family. Architectural treatment is simple and in scale to the size. Construction and material are simple but durable and readily obtained from rural supplies or from the farm."

J. Robert Dodge (FB&RH)

F. C. Fenton of Kansas State was installed as new president of the Society.

The John Deere gold medal for distinguished achievement in the application of science and art to the soil was awarded to R. B. Gray (Farm Machinery) whose research in machinery improvement has been conducted in this country and abroad. With USDA since 1925, Mr. Gray has contributed to advances in machinery for tillage, fertilizer placement, corn borer control, and the harvesting of new crops.

Doctorate to Hienton

For leadership and distinguished service in the application of engineering science to agriculture, Purdue University recently conferred an honorary doctorate of science upon Truman E. Hienton, head of the Farm Electrification Division. Dr. Hienton taught at Purdue from 1924 until he went in the Army in 1942, and he remained a member of the faculty until he came to the Bureau in 1946. During his war service--including 2 years in Iran, a year in the Philippines, and an assignment in Japan--he was advanced to the rank of colonel. Still in the Reserves, he now heads a training group for officers in research and development of ordnance. He holds a BSA from Ohio State and BSAE and MSAE from Iowa State College.

Staff Begins Work in Radioactive Greenhouse

Research is now getting under way in the specially designed greenhouse for tracer studies of soils and plants. Built with funds allocated by the Atomic Energy Commission, the new structure is located at Plant Industry Station, west of the Soils building and directly south of the Range 3 greenhouses. It consists of a brick headhouse (27 by 65 feet) and a 3-section greenhouse (117 by 40 feet). A 7-foot chain link fence encloses the building and 2 acres of land, which will provide space for experimental work in cold frames and lysimeters. Because of radiation hazards, admission to the area will be restricted to staff members trained in taking necessary precautions.

Research workers who will have laboratories in the new building are: Arnold J. MacKenzie, in charge of the chemical analyses and also in charge of the greenhouse; Dr. James M. Blume, who is conducting studies in calcium and liming; Dr. John C. Brown, who is continuing fundamental investigations on the soil biochemistry and plant physiology involved in lime-induced chlorosis of plants; Dr. Takuma Tanada, who is studying the effects of radiation on plants; and Dr. Maurice Fried, who has charge of the phosphate fixation investigations.

The work, which so far has been with phosphorus, will be expanded to include calcium, zinc, and sulfur in the near future.

Dr. L. T. Alexander, who this year received a superior service award for his achievements in soil science, is collaborator for the investigations using radioactive materials. The soils research is under the direction of Dr. L. A. Dean, the plant studies under Dr. S. B. Hendricks.

(For a more complete description of the distinctive features of the new greenhouse, see USDA Press Release No. 1211-50.)

Quick Detection of Chrysanthemum Stunt Now Possible

Since infection with chrysanthemum stunt, a virus disease, usually does not express symptoms during the year it takes place, stock plants for propagation may appear healthy and yet carry the virus.

Dr. Philip Brierley has found that Cinerari (Senecio cruentus) is susceptible and will express symptoms as early as 4 weeks after inoculation in cool weather. Variations in the reaction of individual Cinerari plants are probably due to the hybridity of the stock used. At high temperatures the Cineraria does not show symptoms but since chrysanthemums are propagated in cool weather this does not preclude the use of the test plant.

The finding will save a whole year in testing propagating stock. Growers of chrysanthemums for the flower crop will not incur losses from the disease if they start off with healthy cuttings because current season infection--transmitted by the cutting knife and pinching--does not affect the flowers.

Recent studies of possible vectors (made in cooperation with BEPQ) have been negative. This indicates that earlier apparent positive results with certain aphid species were probably due to the use of already contaminated stocks.

Alfalfa Hybrids or Synthetics?

Improved varieties of alfalfa that are likely to be distributed during the next few years will probably be synthetic rather than hybrid varieties, points out Dr. O. S. Aamodt (FC&D).

Several years ago considerable attention was given to the possibility of producing hybrid alfalfas on a commercial scale. Preliminary evidence indicated that increased yields of hybrids over commonly produced varieties might be around 20 percent for forage and about 30 percent for seed. These early experimental hybrids were produced by propagating improved clonal lines vegetatively and then combining different lines into a double-cross hybrid as in corn.

The generally accepted definition for most cross-pollinated plants for a hybrid is controlled pollination of known parents. Production of alfalfa seed by clonal propagation by known parents in alternate rows might comply with the accepted definition.

In the meantime, synthetic varieties were produced by mixing the seed from superior clones planted in isolation into a composite, which is then increased through succeeding seed generations. The synthetic variety does not meet the requirements of a hybrid variety, since the seed is produced by indiscriminate crossing among the parents rather than through controlled crosses of two clones as obtained from planting self-sterile but cross-fertile clonal lines in alternate rows.

The cost of producing a synthetic variety by compositing the seed of known improved strains or by interplanting of clones in isolation followed by seed increase through succeeding generations rather than by propagation of clonal lines will be considerably less than the cost of producing hybrids. In synthetics, one can, and often would, include a larger number of superior lines without any mechanical difficulties and thereby assure a broader genetic base. Preliminary results on testing and evaluation of advanced generations of hybrids and synthetics through the third generation have indicated that the synthetic has been nearly as productive as the hybrid varieties developed to date.

2,4-D Reduces Drop of Pineapple Oranges in Florida

Dr. F. E. Gardner and coworkers (F&VC&D), Orlando, Fla., report that Pineapple orange trees sprayed in December with the sodium salt of 2,4-D at concentrations of 25 and 30 parts per million lost only 6 and 3 percent of their fruit from drop by mid-February when unsprayed trees lost 18 percent. Applications at the same time and in the same concentrations affected Temple oranges favorably but did not affect Valencias. It is possible that a different timing of sprays in Florida may give results with Valencias since fruit drop in this variety is reported controlled by 2,4-D in California. Most convenient time to apply the 2,4-D in Florida is during the winter dormancy period when this chemical can be combined with wettable sulfur for rust mite control. In these tests the addition of sulfur did not significantly decrease the effectiveness of the 2,4-D.

Progress in Potato Breeding

More than 50 percent of all the certified potato seed stock produced in the United States in 1949 consisted of varieties distributed during the past 18 years under the National Potato-Breeding Program, which is cooperative between USDA and a number of the Stations.

Dr. F. J. Stevenson (F&VC&D) notes that more than 30 new varieties are on the seed certification lists for various States. Most of these possess characters that give them an advantage over the old standard varieties in the sections to which they are adapted. Kennebec, for example, a recent introduction, is immune to the common physiologic races of late blight, to mild mosaic, so far to net necrosis. These three diseases cause severe losses in the standard Maine variety, Green Mountain. In a 1949 test in Maine without spray protection of any kind, Kennebec produced 475 bushels per acre in comparison with Green Mountain's yield of 274 bushels. In Maine, Kennebec is an all-purpose potato. It has high quality whether baked, boiled, fried, or used in salad, or made into chips. It has also produced satisfactorily in other States.

Three other seedling varieties, not yet distributed, show special promise in other sections of the country. One of these, which produces a long-type russet-skin tuber somewhat like Russet Burbank, has created much interest in North Dakota. Another, immune to the common forms of late blight and somewhat resistant to scab, is promising in North Dakota, Iowa, and some of the muck lands of Indiana. A third has been outstanding in Virginia. Harvested at Norfolk on the same day as standard Irish Cobbler, it yielded 77 percent more in 1949. At Onley, Va., with a rainfall of only 10 inches during the growing season, it yielded 332 bushels per acre. In comparison the Irish Cobbler produced 187 bushels. Immune from the common forms of late blight, this seedling variety may be suitable for the spring or fall crop.

Important results have been and can yet be obtained by recombining the many valuable characters found in the complex Solanum tuberosum group. There is also a growing interest in the wild species of Solanum and in hybrids between species. Two of the most promising are S. demissum and S. polyandrum. Chief advantages of the first are its immunity from all the physiologic races of late blight and its tolerance of frost. The second is highly resistant, if not immune to leafhoppers, flea beetles, and aphids. So far attempts to hybridize these two wild species with S. tuberosum have been unsuccessful. Some of the other 150 species of Solanum possess characters that will enrich the genetic pool if intersterility can be overcome. Various techniques are being used in an effort to overcome some of the difficulties.

To What Extent Can Irrigation and Dry-Land Practices Be Combined

In a recent meeting of the Northern Plains Planning Council in Lincoln, Neb., it was pointed out that a combination of irrigation and dry-land farming may be the best answer for many operators in the region. This suggests, says W. W. Pate (Soils) who attended the sessions, the need for research to show how these two types of farming can be integrated. A cooperative study made by the Montana Station and BAE shows that over the past 30 years a large number of farmers with small diversified units on irrigation projects have reached out into the adjoining dry land areas with profit. These farmers, the data show, had a larger livestock inventory, more hay, and more feed cattle than farmers whose operations were confined to the irrigated lands.

Long-Term Fertilizer Test Shows Change in Trend

The importance of a proper balance between nitrogen and potassium in tung fertilization is emphasized in results reported by B. G. Sitton and Marshall S. Neff (F&VC&D).

In experiments at Bush, La., the highest yields for the first three years came from young tung trees on plots receiving liberal applications of nitrogen and no other fertilizer. But in the next three years, these trees did not gain in yield but toward the last showed slight losses while trees on plots getting both nitrogen and potassium and those with potassium alone have continued to increase in yield. Similar effects have been observed in plots at Monticello, Fla., where as the tests have progressed, the relative importance of nitrogen and potassium has been reversed.

Chilling Injury of Tomatoes under Study

New insight into the nature of cold injury in tomatoes comes from storage and transportation studies now in progress by Lacy McColloch (F&VC&D). Beginning with the knowledge that the fruits are susceptible to injury when held at temperatures of less than 50° F., Mr. McColloch has found that the first manifestation is increased susceptibility to the invasion by decay-producing organisms. Infection may take place long before the typical scald-like areas showing cold injury develop. This explains why tomatoes picked in the cool fall months toward the end of the season often develop large amounts of decay in transit.

Protein Supplements Increase Mushroom Yields

The addition of 1 to 7 pounds of nitrogen per ton of manure used as a compost for growing mushrooms gave proportional increases in mushroom yields, report Dr. E. B. Lambert and Dr. T. T. Ayers (F&VC&D).

The nitrogen was added in the form of cottonseed meal, brewer's grains, and other high-protein foodstuffs. For example, one hundred pounds of cottonseed meal added to one ton of manure gave 120 pounds of additional mushrooms in these tests.

This finding is of special interest to Eastern mushroom growers who now depend on racing stables for their chief source of manure. This material contains more straw or other bedding and less organic matter than that formerly available from work-horse stables. Additions of inorganic nitrogen, various vitamins and growth-regulating substances were without significant effect in the studies by Lambert and Ayers.

Future Meetings

July 17-21 - Association of American Nurserymen. Hotel Statler, Washington, D. C.

August 7-12 - International Apple Association. Hotel Statler, Washington, D. C.

Agricultural Research Under Point IV

Reporting on a mission that took him to 10 Asiatic countries to survey possibilities for technical collaboration in agriculture under the Point IV program, Dr. A. H. Moseman, Special Assistant to the Chief of the Bureau, told a seminar at Plant Industry Station recently, that:

The foremost need is for improved extension programs to carry already available knowledge to the people on the land. Food production could be improved materially if the results of the good agricultural research in these countries were disseminated and put into practice.

There are specific problems which could well be attacked through technical collaboration under Point IV. Soil management practices, including the control of salinity and the use of green manures and fertilizers, should receive attention. Insects, particularly in stored grains, cause large annual losses throughout the area. The development of simple, inexpensive tools would reduce man labor materially and permit more timely planting and harvesting operations.

A third pressing need is for the more adequate utilization of the competence already available in these countries. Their government leaders must be made to realize the potential benefits from technology in agriculture and to provide adequate salaries and working funds so the talents of the many well-trained research workers can be applied more effectively to the problems in agriculture.

Technical Aid to Africa Under Study

C. O. Erlanson (PEI) served as technical observer for the ECA at sessions of a special working committee of the Office of European Economic Cooperation in Paris, May 23-25.

Object of the meeting was to discuss possible technical assistance in plant breeding that might be given to European dependent territories South of the Sahara. Approved projects would be financed by ECA.

Mr. Erlanson reports that the meeting brought out excellent opportunities for a coordinated attack on crop breeding problems in corn, peanuts, cotton, sorghum, cacao, and oil palm.

Countries represented on the committee were France, the Netherlands, Portugal, Belgium, Italy, and Great Britain.

Another Tetraploid Apple for Breeders

A "giant" sport of Delicious apple has been determined by Dr. Haig Dermen (F&VC&D) to be a true-breeding tetraploid and thus becomes the sixth tetraploid apple available to breeders for crossing with diploid types to produce triploid seedlings. The other five are tetraploid forms of McIntosh, Wealthy, Yellow Transparent, Hiberna, and Ontario. Crosses made with 4X McIntosh as a parent have produced triploid seedlings. Many of the best commercial apple varieties are triploids, and the ready production of large numbers of such seedlings is a most important advance in apple breeding.

To Soils Congress in Amsterdam

Dr. Charles E. Kellogg (SS) heads the U. S. delegation to the Fourth International Congress of Soil Science in Amsterdam. Dr. Kellogg, vice-president of the Congress, will present a lecture on tropical soils and discuss the research work of the leading soil scientists from all parts of the world. Following the Congress he will consult with soil scientists in Ireland, Portugal, France, Belgium, the Netherlands, England, and Iceland.

Two other members of the Soil Survey Division who are attending the Congress are J. Kenneth Ableiter and James Thorp. Mr. Ableiter will also study soils, soil mapping, and research methods at scientific institutes in England, France, Switzerland, Holland, and Belgium. Mr. Thorp will focus attention on the polder soils, reclaimed from salt water marshes and lakes and the brown earths of river terraces and uplands in Belgium, the loess deposits and dune sands of the low countries, and the brown earths, Rendsinas, and gley soils of Great Britain.

Other staff members in Europe for the Soil Science Congress are Dr. S. B. Hendricks, Dr. R. Q. Parks, Dr. L. A. Richards, and Dr. Francis E. Clark. Dr. Hendricks will also attend the Botanical Congress in Stockholm and the International Conference on Carbon Dioxide Fixation to be held in Sheffield, England. Prior to the meetings he visited Spain and Portugal as the guest of the ministries of agriculture.

Dr. Parks will go to Switzerland after the meeting to study the research program in fertilization and management of mountain meadows. He will travel in France, Belgium, Denmark, the Netherlands, and the British Isles.

Dr. Richards will pay special attention to the reclamation of soils in Belgium and France that have been sodiumized by sea water. He will study soil physics research in England.

Dr. Clark will present two papers on the soil biology program at the Amsterdam meeting. He will also attend the Botanical Congress in Stockholm.

Eight Scientists to Stockholm

In Europe for the Seventh International Botanical Congress at Stockholm, July 12-20, are Dr. Sidney Blake (PE&I), John A. Stevenson, Dr. W. W. Diehl, and Muriel O'Brien (Mycology), Dr. Lee M. Hutchins and G. F. Gravatt (FP), Dr. E. R. Sears (Cereals), and Dr. Richard Evans Schultes (RPI).

Dr. Blake and Mr. Stevenson are official delegates to the section on nomenclature. Prior to the Congress and following the meetings, Dr. Blake will do bibliographical research in libraries and botanical institutions in Paris, London, Copenhagen, and Amsterdam to obtain material for Part II of his "Geographical Guide to Floras of the World." Following the conference, Mr. Stevenson will confer with mycologists in England.

Dr. Diehl will present proposals for changes in the international rules of botanical nomenclature and after the conference he will study in herbaria in Sweden, Denmark, the Netherlands, Belgium, France, Switzerland, and Great Britain.

Dr. Sears will present a paper on the origin and evolution of wheats before the section on experimental taxonomy of which he is vice-president. He will then visit experiment stations in Sweden, Germany, France, and England where small grain improvement and wheat genetic studies are under way.

Dr. Hutchins will present a paper on virus diseases of forest trees. His itinerary is taking him to Great Britain, France, Belgium, the Netherlands, Germany, Switzerland, Denmark, and Norway to obtain information on diseases that would damage native American forest trees if introduced here.

Mr. Gravatt will address the Congress on "The Problem of the World-Wide Spread of Forest Diseases" and will remain for a period in Europe to do forest pathological work for the ECA.

 * NOTES ON PERSONNEL *

Barker Heads Cotton Division

Dr. Henry D. Barker, senior plant pathologist, has been named head of the Division of Cotton and Other Fiber Crops and Diseases to succeed Dr. Charles R. Sayre, who resigned July 15 to become president and managing director of the Delta and Pine Land Company at Scott, Miss.

Dr. Barker has been in charge of the Bureau's research on the nature, cause, and control of cotton diseases since 1936. During this time he has built up an effective cooperative research program in this field. His first work with the Bureau dates back to March 1917 when he was named a field agent while doing graduate work at the University of Minnesota. A native of Tamassee, S. C., he is a graduate of Clemson College, holds a master's degree from the University of Wisconsin, and a PhD from the University of Minnesota.

From 1924 to 1936 Dr. Barker was on the staff of the Haiti Experiment Station first as a botanist and plant pathologist and later as cotton specialist and director.

Dr. E. H. Toole (F&VC&D) was named a member of the executive committee of the International Seed Testing Association at the 9th Congress held in Washington in May.

Dr. W. E. Larson, who received his PhD from Iowa State in 1949, heads up the new cooperative research program in fertilizer, irrigation, and cultural practices at the Huntley Branch Experiment Station in Montana. The Great Western and Holly Sugar Companies are cooperating with the Bureau and the Montana Station and Extension Service in these long-term studies. Experiments this year will: (1) study the effects of different amounts and combinations of nitrogen, phosphate, and potash on total yields of beets and sugar when soil moisture is kept as near optimum as possible; and (2) determine the best fertilizer practices and plant spacings for corn production.

Dr. Howard Haise, formerly assigned to soil management and crop production investigations in the lower Colorado Basin at Yuma, Arizona, is now directing the Bureau's soil management research and irrigation investigations in the Missouri Basin. His headquarters are at Mandan, N. D. Experiments have been set up to study corn, alfalfa, potatoes, sugarbeets, and grass under irrigation in this region.

DEATHS

Frederick C. Bradford, Superintendent of the Plant Introduction Garden at Glenn Dale, Md., since 1937, died at his home there June 20. He was 63.

A native of Lowell, Mass., Mr. Bradford was graduated from Harvard University and received his master's degree from the University of Maine. He taught horticulture at Oregon State College, the University of Missouri, and Michigan State College before joining the Bureau.

An outstanding horticultural scholar and linguist, Mr. Bradford had an unusual breadth of interest and knowledge in this field. For many years prior to joining the Bureau he had conducted studies on the inter-relationships of climatic factors on fruit production. Through his keen ability to choose material of special interest to breeders from the large collections of deciduous fruits at Glenn Dale, he made valuable contributions to plant improvement. During recent years he has been chiefly concerned with the selection of hardy apple inter-stocks, varieties of apples best adapted for the production of cider, and cherry stocks resistant to "leaf-spot" disease. Some of these are now being distributed.

Mr. Bradford was co-author of the well known and widely used textbook "Fundamentals of Fruit Production," published by McGraw Hill in 1939.

He leaves his widow, Mrs. Pearl Whitehouse Bradford, a daughter, Mrs. Barbara B. Costello, Arlington, Va., and two sons, William R. of Silver Spring, Md., and Richard H., who was graduated in horticulture in the 1950 class of the University of Maryland.

Radio Broadcasts by Bureau Scientists

Tape recordings for broadcast over Station WGN, Chicago, during coming months were made by Farm Director Hal Totten, June 8, in interviews with:

Dr. F. P. Cullinan (Asst. Chief) - on "New Varieties of Fruits and Vegetables"
 Dr. A. H. Moseman (special Asst. to Chief) - on "Research Around the World"
 Dr. W. M. Myers (FC&D) on "New Grasses for the Midwest"
 C. S. Garrison (FC&D) on "Increasing Seeds of Better Forage Crops"
 Dr. Curtis May (FP) on "Wilt Disease of Oaks"
 C. O. Erlanson (PE&I) on "Foreign Plants Basic to Crop Improvement"
 Dr. C. E. Kellogg (SS) on "Soil Surveys Basic to Farm Management"
 W. T. Pentzer (F&VC&D) on "Better Fruits and Vegetables for Consumers"
 J. R. Dodge (FB&RH) on "New Developments in Farm Housing"
 J. R. McCalmont (FB&RH) on "Better Housing for Livestock"
 T. E. Hienton and L. E. Campbell (FE) on "Ultrasonic Energy in Agriculture"

Tape recordings for broadcast over Station KLZ, Denver, were made by Farm Director Lowell Watts, June 14, in interviews with:

Dr. Cullinan on "Introductions of Fruits and Vegetables of Interest to the West"

Dr. S. L. Emsweller (F&VC&D) on "Advances in Lilies and Other new Flowers"

Recent Bureau Press Releases

Copies of the following releases may be obtained from Press Service, Office of Information, U. S. Department of Agriculture, Washington 25, D. C.

<u>Date</u>	<u>Subject</u>
May 1	Zipppers on bumblebee cages aid alfalfa breeders - USDA 1067-50
May 5	Leaf sprays handy but may not always fill apple tree's nitrogen needs - USDA 1119-50
May 15	New cleaning device developed for cotton - USDA 1199-50
May 16	Prepackaging calls for refrigeration also - USDA 1217-50
May 19	Soil fumigation reduces cotton losses from wilt and nematodes - USDA 1248-50
May 22	Heavily fertilized gladioli subject to leaf spot - USDA 1254-50
May 23	Circular lists more than 350 names of carrots - USDA 1258-50
May 26	USDA soil survey chief to Europe for consultations on research - USDA 1295-50
May 28	Vegetable lore popular - C.S. 1177-50
May 29	USDA engineering study highlights problems in alfalfa dehydration - USDA 1301-50
June 2	E. G. McKibben to be in charge at U. S. Tillage Laboratory, Auburn, Ala. - USDA 1336-50
June 6	Seed-protecting dusts and sprays must meet many tests - USDA 1364-50
June 7	New chemical shows promise in wild onion control - USDA 1365-50
June 9	Salter sees great opportunity for progress through agronomy - USDA 1373-50
June 12	Hinton tells of new farm electricity studies - USDA 1414-50
June 12	Waterweed control progress reported to engineers by USDA scientist - USDA 1389-50
June 15	Rootstock may be key in control of peach orchard nematodes - USDA 1455-50
June 15	USDA specialist uses plastic wrap to speed woody-plant propagation - USDA 1460-50
June 16	USDA engineer reports pressures cause potato bin wall failures - USDA 1479-50
June 16	Progress on small farmhouse plans reported by USDA architects - USDA 1476-50
June 21	New greenhouse for radioactive research completed at Beltsville, Md. - USDA 1520-50
June 26	USDA Lawn leaflet lists 14 Steps and many points - USDA 1555-50
July 9	New chemicals call for caution - C.S. 1517-50
July 9	Sulfuric acid aids beet breeders - C.S. 1517-50

State Bulletins by Bureau Scientists

Larson, C. A., and Schlafer, E. L. Hybrid field corn 1949 trials in Oregon. Oreg. Circular of Inform. No. 484, April 1950

Pendleton, R. A., Ginnell, H. E., and Reimer, F. C. Sugar beet seed production in Oregon. Oreg. Agric. Exp. Sta. Bul. 437, revised March 1950

Outside Publications

Alexander, L. T. Radioactive materials as plant stimulants - Field results (summary). Amer. Soc. Agron. Jour. 42, May 1950.

Andrus, C. F., and Hoffman, J. C. Fullgreen, a blight-resistant bush snap bean. Seed World, May 1950

Arreguin, Barbarin and Bonner, James. The biochemistry of rubber formation in the guayule. II. Rubber formation in aseptic tissue cultures. Arch. Biochem. 26, April 1950

Borland, J. W., and Reitemeier, R. F. Kinetic exchange studies on clays with radioactive calcium. Soil Sci., April 1950

Brandes, E. W. Sugar down the ages: A new history, by Noel Deerr. (Review of "The History of Sugar", Vol. 1, by Noel Deerr). Sugar, May 1950

Brandes, E. W. Heterosis or hybrid vigor in sugarcane. Abs., Sugar Bulletin, May 1950.

Cole, John R. Bordeaux mixture alone or bordeaux mixture followed by Ziram may be used to control pecan scab. Southeastern Pecan Growers Assoc. Proc., Vol. 43, 1950.

Cooley, J. S., and Groves, A. B. Root and collar winter injury of apple trees. Phytopath., April 1950

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